UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/986,880	11/13/2001	Junichi Shinohara	215837US2	6153

22850 7590 02/14/2006

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
YE, LIN	

ART UNIT	PAPER NUMBER
2615	

DATE MAILED: 02/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/986,880	SHINOHARA ET AL.	
	Examiner	Art Unit	
	Lin Ye	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-70* is/are pending in the application.

4a) Of the above claim(s) *18-62,64-66 and 68-70* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17, 63 and 67* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 November 2001* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1-17, 63 and 67 filed on 12/12/02 have been considered but are moot in view of the new ground(s) of rejection.

As further discussed during the interview with Applicants' representative on 10/11/2005, the copy of machine translation of Okada et al. J.P. Patent Publication 10-056595 is vague and confusing. The examiner has found a formal translation of Okada (Okada et al. U.S. Patent 6,226,086) which equivalent to the Okada et al. J.P. Patent Publication 10-056595 for providing a better English translation.

Therefore, Claims 1-7, 9-13, 63 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada et al. U.S. Patent 6,226,086 in view of the applicants admitted prior art.

This Office Action is not made final.

Drawings

2. Figures 27A-C and 28A-C should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be

notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-7, 9-13, 63 and 67 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada et al. U.S. Patent 6,226,086 in view of the applicants' admitted prior art.

Referring to claim 1, the Okada reference discloses in Figures 4, 10 and 12, an image input unit capable of performing pixel shift photography, said image input unit comprising: a photographic optical system (optical series 2, See Col. 12, lines 42-43) which forms an image of a subject in a predetermined position; an image sensing unit (solid-state imaging element 5, see Col. 12, line 45) which generates image data corresponding to the image of the subject; a pixel shift mechanism (3 and 4, see Col. 12, line 44) which displaces a subject image by a predetermined amount relatively with respect to the image sensing unit (5) as shown in Figure 4 (See Col. 6, lines 38-67); a pixel shift mechanism control unit (control circuit 8) which controls said pixel shift mechanism so as to displace the image of the subject by the predetermined amount (e.g., Xr=1/2Px, Yr=1/2 Py, see Col. 7, lines 31-35); an image combining unit (image synthesizing circuit 6, see col. 12, lines 57-67) which generates image

data for one image (synthetic image) by combining the image data for a plurality of images output before (e.g. image A is the image before the displacement) and after (e.g., image B is the image after the displacement considered as final picture) the displacement; and a judgment unit (e.g., operation judging circuit 10, see Col. 13, lines 1-8) which judges whether the pixel shift photography has been normally performed or not, before and after the displacement as shown in Figures 4, 12 and 13 (e.g., the Figure 12 clearly shows the image memory 31 for storing the image data A, image memory 32 for storing the image data B. The moving amount is detected based on the amount of motion vector between the image data A and B by detecting unit 9, see Col. 14, lines 50-67 and Col 15, lines 1-13. In Figure 13, when the moving amount dx > 1/10Px and dy>1/10Py, the pixel shift photography has been judged as unnormal so that the image synthesizing circuit 6 have to perform an additional operation such as interpolating image data as correction for forming a high-resolution synthesized image). However, the Okada reference does not explicitly show the shift mechanism displacing the image-sensing unit instead of displacing the transparent planes 3a and 4a.

The applicants' admitted prior art teaches in Figure 27A-C, three typical examples for the conventional image shift mechanism, the Figure 27A shows a CCD shift method, the Figure 27B shows a LPF gradient method and the Figure 27c shows a lens shift method. The applicants' admitted prior art is evidence that one of ordinary skill in the art at the time to see more advantages the image input device having more flexible methods to perform the pixel shift photography so that the desired image quality can be obtained easily (See applicants' specification, page 2, line 19 through page 3, line 20). For that reason, it would have been obvious to one of ordinary skill in the art to modify the image input unit of Okada ('086) by

providing the shift mechanism displacing the image-sensing unit for obtaining high quality image as taught by applicants' admitted prior art.

Referring to claim 2, the Okada reference discloses wherein said judgment unit (10) comprises: a pixel shift evaluation value calculation unit (motion vector calculator 33, see col. 14, lines 56-61) which calculates a pixel shift evaluation value for judging whether the pixel shift photography has been normally performed or not as shown in Figure 13, based on the image data for a plurality of images output before (e.g., image A) and after (e.g. image B) the displacement of said image sensing unit (See applicants' Figure 27A); and a pixel shift photography judgment unit (judgment circuit 10) which judges whether the pixel shift photography has been normally performed or not, based on the pixel shift evaluation value calculated by said pixel shift evaluation value calculation unit as shown in Figure 13.

Referring to claim 3, the Okada reference discloses wherein said pixel shift evaluation value calculation unit calculates an amount of shift between the image data for the plurality of images output before and after the displacement of said image sensing unit (e.g., amount motion vector between image A and image B, see Col. 4, lines 49-62), as the pixel shift evaluation value; and said pixel shift photography judgment unit judges whether the pixel shift photography has been performed normally, based on the amount of shift calculated by said pixel shift evaluation value calculation unit as shown in Figures 10 and 13.

Referring to claim 4, the Okada reference discloses wherein when calculating the amount of shift between the image data for the plurality of images, said pixel shift evaluation value calculation unit calculates each amount of shift (e.g., X=Xr+dx and Y=Vr+dy) for a plurality of areas of the image data as shown in Figure 4.

Referring to claim 5, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has been performed normally when a part of or the whole of the amount of shift in the plurality of areas calculated by said pixel shift evaluation value calculation unit is within a predetermined range as shown in Figure 13 (e.g., whether or not the moving amount is great than a predetermined value, see Col. 15, lines 1-13).

Referring to claim 6, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has not been performed normally when a part of or the whole of the amount of shift in the plurality of areas calculated by said pixel shift evaluation value calculation unit is out of the predetermined range (when the moving amount is great than a predetermined value, dx>1/10Px, or dy>1/10Py) and there is a predetermined relation in the amount of shift in the plurality of areas as shown in Figure 13.

Referring to claim 7, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has been performed normally, but a part of the subject has moved (e.g., the image subject has moved by an unstable vibration as blurring), in the case where a part of or the whole of the amount of shift in the plurality of areas calculated by said pixel shift evaluation value calculation unit is out of the predetermined range, but there is no predetermined relation in the amount of shift in the plurality of areas as shown in Figure 13, steps S33-S34.

Referring to claim 9, the Okada reference discloses wherein said pixel shift evaluation value calculation unit calculates the coincidence degree (by using point matching method is considered as calculating the coincidence degree for detecting amount of moving, see Col.

14, lines 51-62) for a target image data, based on an image data output by said image sensing unit before and after being displaced, as the pixel shift evaluation value; and said pixel shift photography judgment unit judges whether the pixel shift photography has been performed normally, based on the coincidence degree calculated by said pixel shift evaluation value calculation unit as shown in Figure 13.

Referring to claim 10, the Okada reference discloses wherein said pixel shift evaluation value calculation unit calculates the coincidence degree, respectively, for the plurality of areas (each pixels in the image plane) of the image data, at the time of calculating the coincidence degree as shown in Figures 18-20.

Referring to claim 11, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has been performed normally when a part of or the whole of the coincidence degree (pint matching) in the plurality of areas calculated by said pixel shift evaluation value calculation unit (9) is within a predetermined range (1/10Px, or 1/10Py).

Referring to claim 12, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has not been performed normally when a part of or the whole of the coincidence degree (point matching for calculating the amount of motion vectors) in the plurality of areas calculated by said pixel shift evaluation value calculation unit is out of the predetermined range, and there is a predetermined relation in the coincidence degree in the plurality of areas as shown in Figure 13.

Referring to claim 13, the Okada reference discloses wherein said pixel shift photography judgment unit judges that the pixel shift photography has been performed normally, but a

part of the subject has moved (e.g., the image subject has been moved by an unstable vibration as blurring), in the case where a part of or the whole of the coincidence degree (point matching for calculating the amount of motion vectors) in the plurality of areas calculated by said pixel shift evaluation value calculation unit is out of the predetermined range, but there is no predetermined relation in the coincidence degree in the plurality of areas as shown in Figure 13, steps S33-S34.

Referring to claim 63, the Okada reference discloses all subject matter as discussed with respected same comments to claim 1.

Referring to claim 67, the Okada reference discloses all subject matter as discussed with respected same comments to claim 1.

5. Claims 8, 14 and 16-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okada et al. U.S. Patent 6,226,086 in view of the applicants' admitted prior art and Kondo et al. U.S. Patent 5,731,849.

Referring to claim 8, the Okada reference and applicants' admitted prior art disclose all subject matter as discussed with respected to claims 1-4, and the Okada reference discloses the judgment unit (10) judges whether the pixels shift photograph has been performed normally, based on the amount of shift in the plurality of areas and the motion vector. However, the Okada reference does not explicitly has a detail about the amount of the motion vectors related to the reliability evaluation data for indicating the reliability of each amount of shift in the plurality of areas.

The Kondo reference teaches in Figure 1, a motion vector detecting apparatus calculating the reliability of the motion vector which is detected in the plurality of areas and weighting process according to the reliability evaluation is executed to the movement vector when there is different motions inherent exist (See Col. 7, lines 53-67). The Kondo reference is evidence that one of ordinary skill in the art at the time to see more advantages the amount of the motion vectors related to the reliability evaluation data for indicating the reliability of each amount of shift in the plurality of areas so that the detection precision of the motion vector can be significantly improved and the vibration detection is optimized (See Col.8, lines 20-33). For that reason, it would have been obvious to one of ordinary skill in the art to modify the image input unit of Okada ('086) by providing a reliability evaluation unit which calculates reliability data indicating the reliability of each amount of shift in the plurality of areas as taught by Kondo ('849).

Referring to claim 14, the Okada, applicants' admitted prior art and Kondo references disclose all subject matter as discussed with respected same comments to claims 8 and 10, and wherein said judgment unit comprises a reliability evaluation unit which calculates reliability data indicating the reliability of each coincidence degree in the plurality of areas calculated by said pixel shift evaluation value calculation unit; and said pixel shift photography judgment unit judges whether the pixel shift photography has been performed normally (e.g., depend on amount of moving), based on the coincidence degree in the plurality of areas and the reliability data as shown in Figures 13 and 18-20.

Referring to claim 16, the Okada, applicants' admitted prior art and Kondo disclose all subject matter as discussed with respected same comments to claim 8, and the Kondo

reference discloses wherein said reliability evaluation unit calculates the reliability data based on the contrast of the image within the range of each of the calculation area (e.g., judging an effective area is set to the peak center and a map having a weight coefficient distribution according to position information which occupies in the areas of each of the blocks, See Col. 7, lines 25-30 and Col. 8, lines 5-15).

Referring to claim 17, the Okada and Kondo references disclose all subject matter as discussed with respected same comments to claims 14 and 16.

6. Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Okada et al. U.S. Patent 6,226,086 in view of the applicants' admitted prior art and Onuki U.S. Patent Publication 2002/0097324.

Referring to claim 15, the Okada reference and applicants' admitted prior art disclose all subject matter as discussed with respected to claim 1, except the Okada reference does not explicitly show an informing unit which informs of the judgment result of said pixel shift photography judgment unit.

The Onuki reference teaches in Figure 46, an image sensing apparatus, which performs pixel shifting operation and including an informing unit (display) which informs (warning message) of the judgment result of the pixel shift photography judgment unit (e.g., when the luring is large, a warning message is displayed when pixel shifting operation is determined, See page 29, paragraph [0054]). The Onuki reference is evidence that one of ordinary skill in the art at the time to see more advantages the image input unit including an informing unit which informs of the judgment result of said pixel shift photography judgment unit so that

easily warning a user of an image not being obtained in desired resolution, or an alternative suggestion to be followed for improving resolution of the image and reducing the effect of movement of an object while performing pixel shifting (see page 3, lines 13-15 and [0031]). For that reason, it would have been obvious to one of ordinary skill in the art to modify the image input unit of Okada ('086) by providing an informing unit which informs of the judgment result of the pixel shift photography judgment unit as taught by Onuki ('324).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.
   a. Okada et al. U.S 5,969,757 discloses an image inputting apparatus judging whether or not a moiré is present when performing an image shifting.
   b. Ito et al. U.S. 6,687,386 discloses a method for detecting an object by template matching related to coincidence degree of the images.
   c. Takeda et al. U.S. 6,734,903 discloses an image sensing apparatus performing a resolution increasing function that has no adverse effect on other functions.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lin Ye whose telephone number is (571) 272-7372. The examiner can normally be reached on Mon-Fri 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L. Ometz can be reached on (571) 272-7593. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Lin Ye
Examiner
Technology Division 2622

February 8, 2006